

ABSTRACT

Compositions and methods for destroying biological agents such as toxins and bacteria are provided wherein the substance to be destroyed is contacted with finely divided metal oxide or hydroxide nanocrystals. In various embodiments, the metal oxide or metal hydroxide nanocrystals have reactive atoms stabilized on their surfaces, species adsorbed on their surfaces, or are coated with a second metal oxide. The desired metal oxide or metal hydroxide nanocrystals can be pressed into pellets for use when a powder is not feasible. Preferred metal oxides for the methods include MgO, SrO, BaO, CaO, TiO₂, ZrO₂, FeO, V₂O₃, V₂O₅, Mn₂O₃, Fe₂O₃, NiO, CuO, Al₂O₃, SiO₂, ZnO, Ag₂O, [Ce(NO₃)₃-Cu(NO₃)₂]TiO₂, Mg(OH)₂, Ca(OH)₂, Al(OH)₃, Sr(OH)₂, Ba(OH)₂, Fe(OH)₃, Cu(OH)₃, Ni(OH)₂, Co(OH)₂, Zn(OH)₂, AgOH, and mixtures thereof.